Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method ~~for a systematic approach to forming experimental design for large complex systems, the method~~ of designing experiments for acquiring processing experience in the design and manufacture of a product comprising:

(a) ~~generating and developing an idea for a product~~ determining critical variables for the product;

(b) ~~develop an experimental design for the product, wherein the experimental design includes~~ generating causal map-based coefficients for a matrix A as a function of the critical variables;

~~(c) determining critical variables for the product;~~

~~(d)~~ (c) setting a design matrix $U_k=0$ and k=0;

~~(e)~~ (d) generating a base design matrix X;

~~(f)~~ (e) ~~running~~ evaluating $Y(P) = (I-B(B^TB)^{-1}B^T)[XP)//U]A$ ~~&~~ according to Wynn's criterion, where P is a permutation matrix, I is an identity matrix, B is a blocking matrix, B^T is a transposed matrix of B, ~~and~~ A is a matrix composed of

causal map-based coefficients, and $Y(P)$ is a possible solution for the design matrix U_k; ~~and~~

~~(g) creating a design matrix U_k~~

(f) setting $k \leftarrow k+1$;

(g) running an algorithm to choose the best of random column permutations matrices P;

(h) running an algorithm to choose the best column permutation matrix P that is near a previous solution for the design matrix U_k; and

(i) setting design matrix U_k to solution comprising XP^k with rows from U_{k-1} appended; and

(m) manufacturing prototype wafers using the experimental design matrix U_k.

2. (Canceled).

3. (Currently Amended) The method of Claim ~~2~~ 1, ~~wherein step (b)~~ further ~~includes~~ comprising:

~~(l)~~ (j) determining whether the design matrix U_k is at desired size; and

~~(m)~~ (k) if the design matrix U_k is not at the desired size repeating steps ~~(h)~~ (f) through ~~(m)~~ (k) until step ~~(l)~~ (j) indicates that the design matrix U_k is at the desired size.

4. (Currently Amended) The method of Claim ~~2~~ 3, ~~wherein step (b)~~ further ~~includes~~ comprising ~~(n)~~ (l) setting the experimental design using the design matrix U_k if step ~~(l)~~ (j) indicates that the design matrix U_k is at the desired size.

5. (Currently Amended) The method of Claim 4 further ~~including~~ comprising:

~~(o) manufacturing prototype wafers using the experimental design U_k;~~

~~(p)~~ (n) determining model responses from the prototype wafers;

~~(q)~~ (o) determining whether the model responses are adequate; and

~~(r)~~ (p) if the model responses are not adequate repeating steps ~~(f)~~ (e) through ~~(r)~~ (p) until step ~~(q)~~ (o) indicates that the model responses are adequate.

6. (Currently Amended) The method of Claim 5 further comprising:

~~(s)~~ (q) assess and propose manufacturing tolerances for the design matrix U_k;

~~(t)~~ (r) determine if the proposed manufacturing tolerances are manufacturable; and

~~(u)~~ (s) if the manufacturing tolerances are not manufacturable repeating steps ~~(b)~~ (a) through ~~(t)~~ (r) until it is determined that the manufacturing tolerances are manufacturable.

7. (Currently Amended) The method of Claim 6 further comprising ~~(v)~~ (t) sending the design matrix U_k to production if it is determined that the manufacturing tolerances are manufacturable.

8. (Currently Amended) The method of Claim 7 wherein step ~~(e)~~ (d) includes:

~~(w)~~ (d1) creating a causal network diagram using information determined in ~~ste (c)~~ step (a);

~~(x)~~ (d2) creating an internode link-count distance matric using information from step ~~(w)~~ (d1);

~~(y)~~ (d3) creating a causal map using information from step ~~(x)~~ (d2);

~~(z)~~ (d4) identifying response nodes from the causal map created in step ~~(y)~~ (d3); and

~~(aa)~~ (d5) calculating map-based coefficients from the information in the causal map.

9. (NEW) A method of developing a semiconductor device comprising:

a development phase including;

evaluating a plurality of processing alternatives;

tuning a nominal process target for each of said plurality of processing alternatives;

a pre-production phase including;

acquiring process experience based upon said tuned nominal process targets comprising;

designing a plurality of experiments including;

determining a plurality of variables for a design of said semiconductor device and the manufacturing of said semiconductor device;

creating a causal network diagram for said determined plurality of critical factors;

transforming said causal network diagram into a causal map;

identifying responses from said causal map;

calculating map-based coefficients for a matrix A as a function of said causal map;

initializing an experimental design matrix U_k wherein k=0;

selecting a base design matrix X;

running an optimal design algorithm to determine said design matrix U_k, wherein said running comprises:

defining $Y(P) = I-B(B^TB)^{-1})B^T)[XP//U]A$ according to Wynn's criterion, wherein P is a permutation, I is an identity matrix, B is a blocking matrix, B^T is a transposed matrix of B, and Y(P) is a possible solution for said design matrix U_k;

running a first algorithm to choose the best of random column permutations matrices P; and

running a second algorithm to choose the best column permutation matrix P that is near a previous solution for said design matrix U_k; and

modeling responses of said plurality of experiments, wherein said plurality of experiments are designed using said design matrix U_k;

determining a tolerance window for each tuned nominal process target; and a production phase including; manufacturing a semiconductor device according to said process targets and said tolerance windows.

10. (New) The method according to Claim 9, wherein a critical variable comprises a response and a factor.

11. (New) The method according to Claim 9, wherein said creating said causal network diagram comprises:

rendering causal relationships wherein a response is the root node, major factors are spines branching of the response, factor groups as the primary branches, lower level factors branching off each spine or off other low level factors, the number of responses can be more than one, responses can point causally to other responses and each factor is represented as a single node; and identifying critical variables that affect other factors.

12 (New) The method according to Claim 9, wherein transforming said causal network diagram into said causal map comprises:

creating an internode link-count distance matrix, wherein a distance between any pair of nodes of a causal network is a minimum number of links of a path connecting the pair of nodes, the corresponding matrix giving said distances between any pair of nodes is a natural input data structure for multidimensional scaling; and

applying a multidimensional scaling algorithm.

13. (New) The method according to Claim 12, wherein said causal map includes information comprising:

a factor closer to a response node plausibly has a stronger effect;

two factors close together likely share an interaction;

responses sharing many factors cluster; and

higher-level factors tend toward a center of said causal map.

14. (New) The method according to Claim 9, wherein said modeling response of said plurality of experiments comprises:

manufacturing prototype wafers for said plurality of experiments according to said experimental design matrix U_k;

generating response models by empirically measuring and mathematically modeling said prototype wafers; and

determining if said response models are adequate.

15. (New) The method according to Claim 9, wherein determining a tolerance window comprises:

proposing tolerances for each tuned nominal process target;

assessing each proposed tolerance; and

determining if the proposed tolerances can be manufactured.